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VIBRATORY PLATE

BPU 3545A

0200301en - 12.2001
0008783 100

Operator´s Manual

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Type	Item no.
BPU 3545A	**0008783 ...**

This machine has been equipped with an EPA certified engine.
Additional information can be found in the engine manufacturers notes.

Foreword

For your own safety and protection from bodily injuries, carefully read, understand and follow the safety instructions in this manual.

Please operate and maintain your Wacker machine in accordance with the instructions in this manual. Your Wacker machine will reward your attention by giving trouble-free operation and a high degree of availability.

Defective machine parts are to be replaced as soon as possible.

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SAFETY INSTRUCTIONS FOR THE USE OF VIBRATORY PLATES WITH COMBUSTION ENGINES

General instructions

1. Vibratory plates may only be operated by persons who

   * are at least 18 years of age
   * are physically and mentally fit for this job
   * have been instructed in guiding vibratory plates and proved their ability for the job to the employer
   * may be expected to carry out the job they are charged with carefully.

   The persons must be assigned the job of guiding vibratory plates by the employer.

2. Vibratory plates may only be used for compaction jobs. Both the manufacturer's operating instructions and these safety instructions have to be observed.

3. The persons charged with the operation of vibratory plates have to be made familiar with the necessary safety measures relating to the machine. In case of extraordinary uses the employer shall give the necessary additional instructions.

4. It is possible that this vibratory plate exceeds the admissible sound level of 89 dB (A). According to the rules for the prevention of accidents regarding emission of noise, the employees have to wear ear protection if the sound level reaches 89 dB (A) or more.

Operation

1. The engine is started by way of a recoil starter. The automatic decompression system makes possible a simple and backstroke-safe engine starting procedure.

2. The functioning of operating levers or elements is not to be influenced or rendered ineffective.

3. During operation the operator may not leave the control elements.

4. The operator has to stop the engine of the vibratory plate before going on breaks. The machine has to be placed such that it cannot turn over.

5. Stop engine before filling fuel tank. When refilling fuel tank, do not allow fuel to come into contact with the hot parts of the engine or spill onto the ground.

6. Do not smoke or handle open fire near this machine.

7. The tank lid must fit tightly. Shut off fuel cock, if available when stopping the engine. For long distance transports of machine operated by fuel or fuel - mixtures, the fuel tank has to be drained completely.

   ☞ **ATTENTION!** Leaky fuel tanks may cause explosions and must therefore be replaced immediately.

8. Do not operate the machine in areas where explosions may occur.

9. Make sure that sufficient fresh air is available when operating vibratory plates with combustion engines in enclosed areas, tunnels, adits and deep trenches.

10. During operation keep your hands, feet and clothes away from the moving parts of the vibraton plate. Wear safety shoes, and eye protection glasses in case of trench operation where falling sand stones maybe ejected.

11. When working near the edges of breaks, pits, slopes, trenches and platforms, vibratory plates are to be operated such that there is no danger of their turning over or dropping in.

12. Make sure the soil or subsoil to be compacted has a high enough load carrying capacity.
13. Use appropriate protective clothing while working or while carrying out maintenance work.
14. When traveling backwards the operator has to guide the vibration plate laterally by its guide handle so that he will not be squeezed between the handle and a possible obstacle. Special care is required when work ing on uneven ground or when compacting coarse material. Make sure of a firm stand when operating the machine under such conditons.
15. Vibratory plates are to be guided such that hand injuries caused by solid objects are avoided.
16. Vibratory plates have to be guided such that their stability is guaranteed.
17. Machines with integrated transport trolley may not be parked or stored on the trolley. This device has only been designed to transport the machine.

Safety checks

1. Vibratory plates may only be operated with all safety devices installed.
2. Before starting operation, the operator has to check that all control and safety devices function properly.
3. Immediately notify your supervisor or superintendent if you have determined defects in the safety devices or other defects which could endanger the safe operation of the machine or which could endanger the environment.
4. In case of defects jeopardizing the operational safety of the vibration plate, the machine has to be stopped immediately.
5. Process materials and operating fuels must be stowed away in receptacles or containers marked according to the respective manufacturers specifications.

Maintenance

1. Only use original spare parts. Modifications to this machine, including the adjustment of the maximum engine speed set by the manufacturer, are subject to the express approval of Wacker. In case of non-observance all liabilities shall be refused.
2. All drive units have to be switched off before carrying out maintenance jobs. Deviations from this are only allowed if the maintenance or jobs require a running engine.
3. When working on vibratory plates equipped with electric starter, disconnect battery before carrying out maintenance or repair jobs on the electric parts of the machine.
4. Remove pressure from hydraulic lines before working on them. Caution: take care when removing hydraulic lines, for the oil may be very hot (up. over 80^{o} C). Precautions are to be taken to prevent oil from splashing into the operator's eyes.
5. As soon as maintenance and repair jobs have been completed all safety devices have to be reinstalled properly.
6. Do not hose down the machine with water after each use to avoid possible malfunctions. Do not use high pressure washers nor chemical products.

Transport

1. During transport, loading and unloading of vibration plates by means of lifting devices, appropriate slinging means or hooks have to be used on the lifting points provided for this purpose on the vibratory plate.
2. The load-carrying capacity of the loading ramps has to be sufficient and the ramps have to be secure such that they cannot turn over. Make sure that no one be endangered by machines turning over by slipping or by moving machine parts.
3. When being transported on vehicles, precautions have to be taken that vibration plates do not slip or turn over.

Maintenance checks

According to the conditions and frequency of use, vibratory plates have to be checked for safe operation at least once a year by skilled technicians, such as those found at Wacker-service depots and have to be repaired if necessary.

Please also observe the corresponding rules and regulations valid in your country.

				BPU 3545A
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Operating weight				
without extension plates		(440)	kg:	294
with extension plates	narrow	(500)	kg:	308
with extension plates	Serial	(600)	kg:	317
with extension plates	wide	(760)	kg:	336
Power transmission				From drive engine directly to exciter unit via centrifugal clutch and gasoline engine
Exciter				
Vibrations			min^{-1} (Hz):	4150 (69)
Multigrade oil				SAE 10W-40
Centrifugal force			kN:	35
Drive motor				Air-cooled single-cylinder 4-stroke gasoline engine with recoil starter
Piston displacement			cm^3:	270
Rated power			kW:	6,6
at rpm			min^{-1}:	3600
Operating rpm's			min^{-1}:	2600
Oil				SAE 10W-40
Fuel				gasoline
Fuel consumption			l/h:	1,6
Tank capacity			l:	6,4
Electrical system				Internal ignition cut-off switch

The required sound specifications, called-for by the EC-Machine Regulations per Appendix 1, Paragraph 1.7.4.f, are

- sound pressure level at the operator's location L_{pA} = 88 dB(A)

The sound values were determined according to ISO 3744 for the sound power level (L_{wA}) and, alternately, ISO 6081 for the sound pressure level (L_{pA}) at the operator's location.

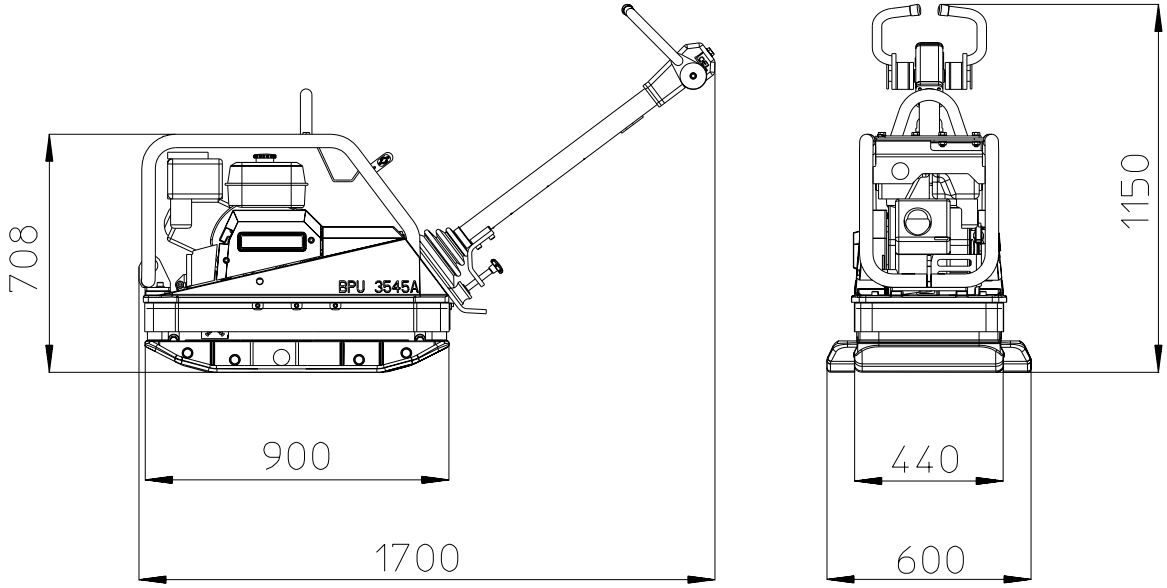
The weighted effective acceleration value, determined according to ISO 8662, Part 1, is 6,4 m/s^2.

The sound and vibration measurements were carried out and obtained with the machine working on crushed gravel at nominal engine speed.

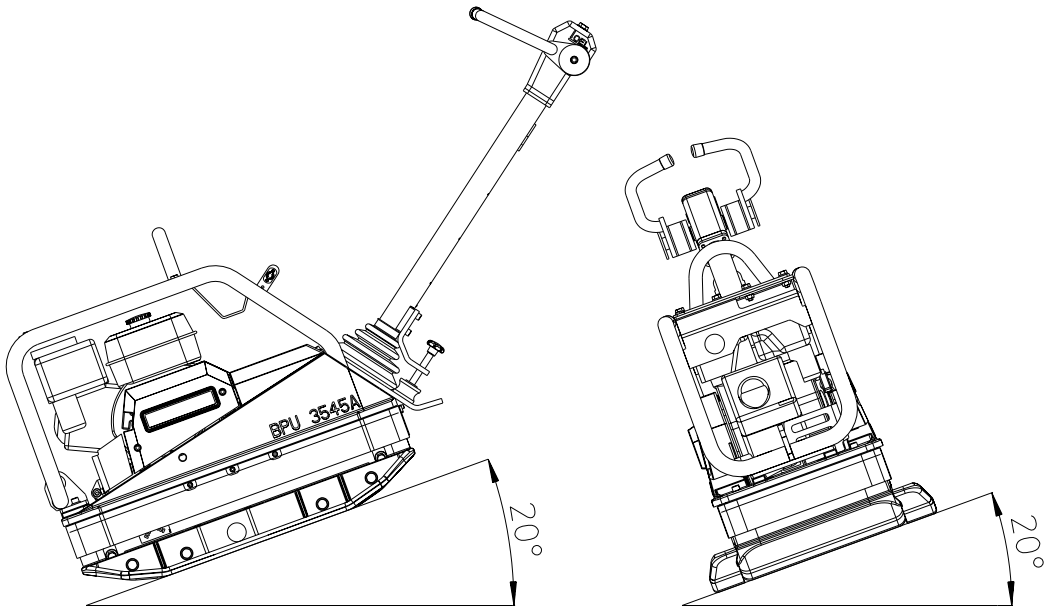
Field of application

The application range of these machines reaches from the trench and surface compaction, even with semi-cohesive soils, to the vibration of interlocking paving stones and sett pavements.

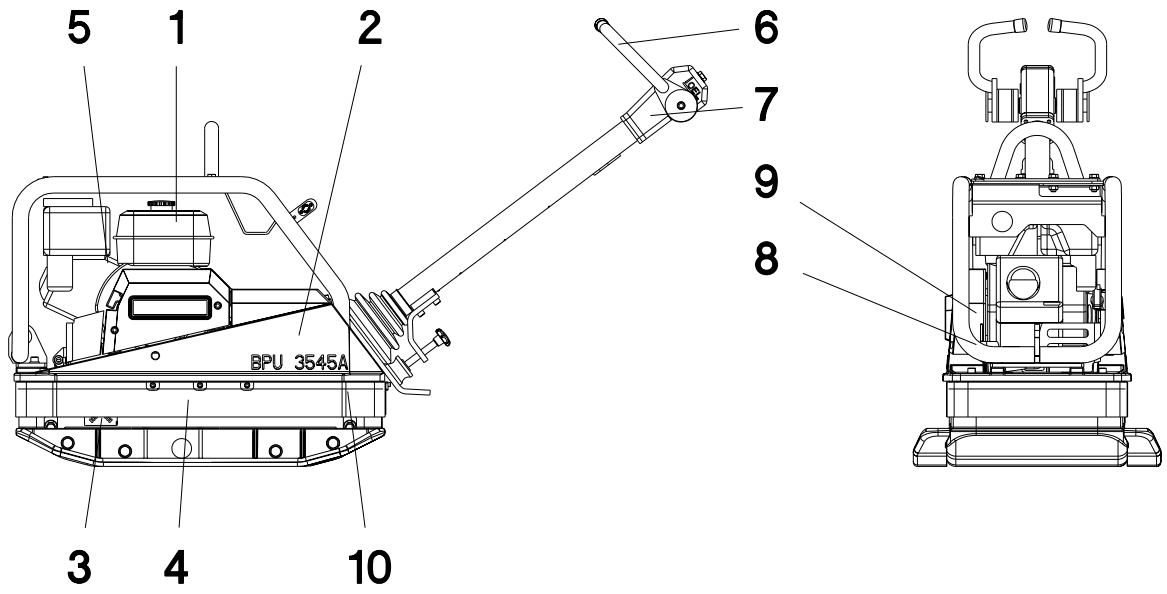
Dimensions



Max. admissible inclination



Description of function



The vibration required for compaction is produced by the exciter (4) which is firmly joinded to the lower mass (3). This exciter (4) is designed as a central vibrator with single-plane vibrations. Such a principle permits the direction of vibration to be changed by turning the eccentric weights (12). In this way an infinitely variable transition between vibration in forward motion, on the spot and in reverse motion is possible. This process is hydraulically controlled with the operating control handle (6) on the centre pole head (7).

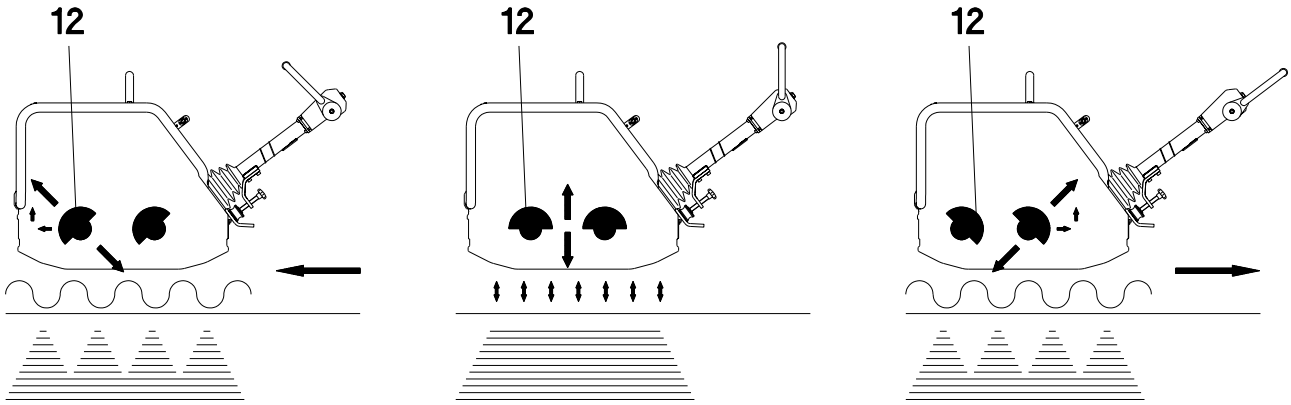
☛ **ATTENTION!** If the machine looses its hydraulic oil it will start traveling backwards (danger of crushing).

The drive engine (1) is anchored to the upper mass (2) and drives the exciter (4). The torque is transmitted by means of a friction connection through the centrifugal clutch (8) and the exciter V-belt (9).

The centrifugal clutch (8) interrupts flow of power to the exciter (4) at low engine speeds and thus permits perfect idling of the drive engine (1). The speed of the drive engine (1) can be infinitely varied by way of the throttle control lever (5).

The upper (2) and lower (3) masses are connected to each other by 4 vibration-damping shock mounts (10). This damping system prevents the very high frequencies from being transmitted to the upper mass (2). As a result the funcionability of the drive engine (1) is retained in spite of the high compaction performance.

The drive engine (1), is started by way of a rewind starter.



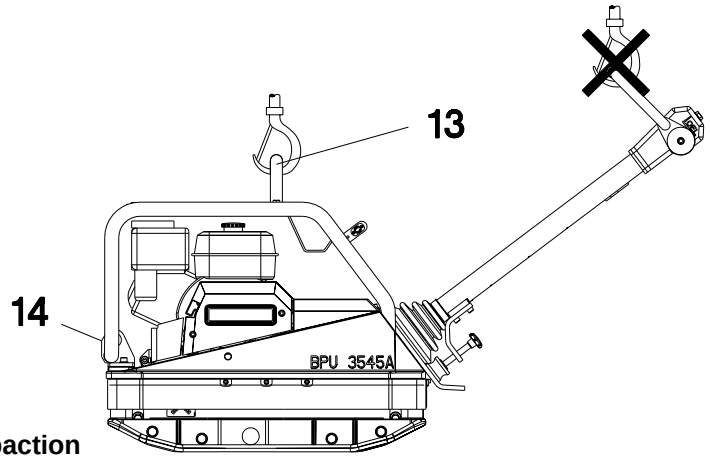
Forwards **On the spot** **Reverse**

Transport to work site

Conditions:

- To transport the vibration plate, use only suitable lifting equipment with a minimum load-bearing capacity of 400 kg.
- Always switch off engine before transporting the machine!
- Only attach suitable tackle at the central lifting point (13) provided.
- During transport on the loading area of a vehicle, tie down the vibraion plate using the lugs (14).

Note: Also oserve the regulations in the safety instructions.



Recommendations on compaction

Ground conditions

The max. compaction depth depends on several factors relating to the ground condition, such as moisture, grain distribution etc.
It is therefore not possible to specify exact values.

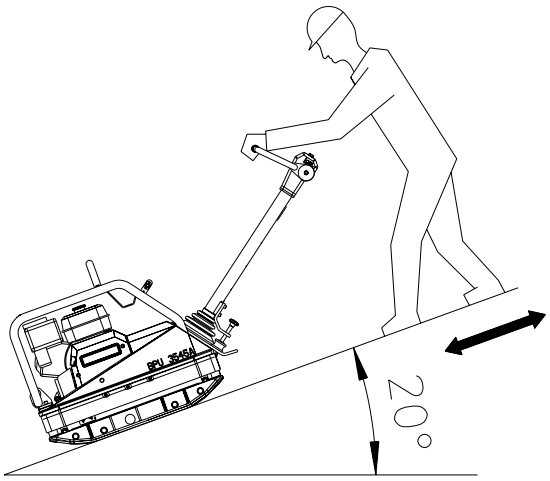
Recommendation: In each case determine the max. compaction depth with compaction tests and soil samples.

Compaction on slopes

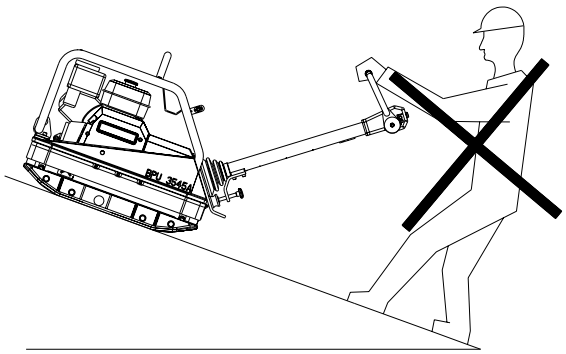
The following points are to be observed when compacting on sloped surfaces (slopes, embankments):

* Only approach gradients from the bottom (a gradient which can be easily overcome upwards, can also be compacted downwards without any risk).
* The operator must never stand in the direction of descent (see chapter “Safety instructions“).
* The max. gradient of 20^{o} must not be exceeded.

☛ **ATTENTION!** If this gradient were exceeded, this would result in a failure of the engine lubrication system and thus inevitably lead to a breakdown of important engine components.



Right !



Wrong !

Starting

Pre-starting check

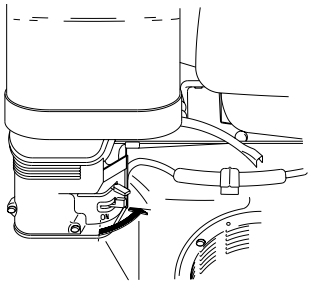
1. **Oil level check**
   Insert dipstick in oil filler neck, but without screwing in. If oil level is low, fill to the top of the oil filler neck with high grade SAE 10 W 40 oil.

2. **Dual-air cleander** >**Dual element type**<
   Check the air cleaner elements to be sure they are clean and in good condition. Clean or replace the elements if necessary.

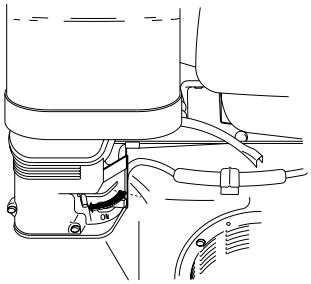
3. **Fuel**
   Use any regular grade automotive gasoline (unleaded gasoline is preferred) with a pump octane rating of 86 or higher.
   Never use an oil/gasoline mixture or dirty gasoline: Avoid getting dirt, dust or water in the fuel tank.
   Caution: Gasoline substitutes are not recommended, they may be harmful to the fuel system components.

Starting the engine

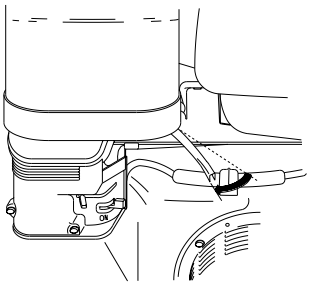
a) Turn the fuel valve to the ON position.
b) Move the choke lever to the CLOSE position.
   Note: If the engine is warm or the air temperature is high, move the control lever away from the CHOKE postion as soon as the engine starts.
c) Move the throttle lever slightly to the left.



a)



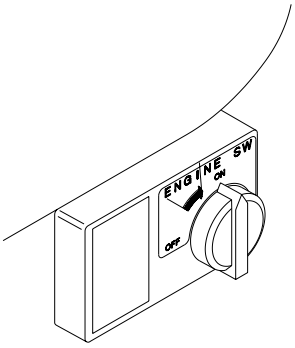
b)



c)

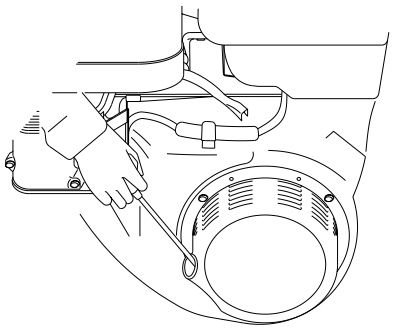
☞ With recoil starter:

d) Turn the engine switch to the ON position.



e) Pull the starter grip lightly until resistance is felt, then pull briskly.

Caution: Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.

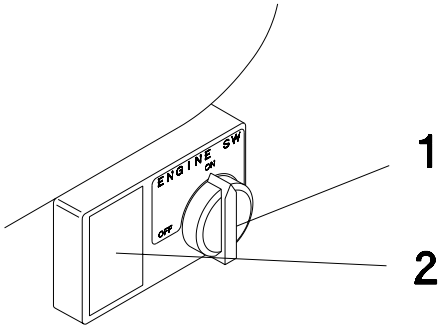


Handling

As the engine warms up, gradually move the choke lever to the OPEN position.
Position the throttle lever for the desired engine speed.

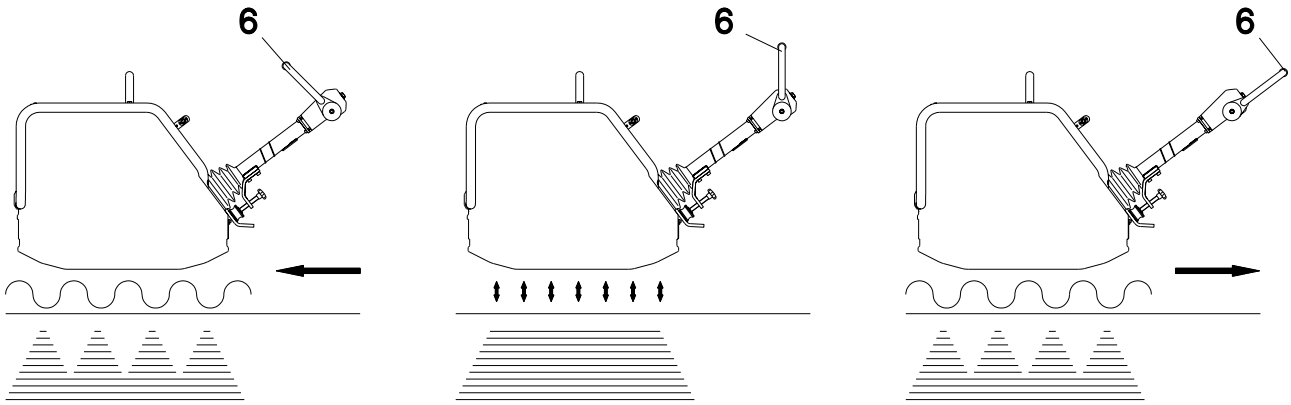
Oil alert system
The oil alert system is designed to prevent engine damage caused by an insufficient amount of oil in the crankcase. Before the oil level in the crankcase drops below a safe limit, the oil alert system will automatically shut down the engine (the engine switch will remain in the ON position).

1 Engine switch
2 Note: If engine does not start check oil level



Forward and reverse motion

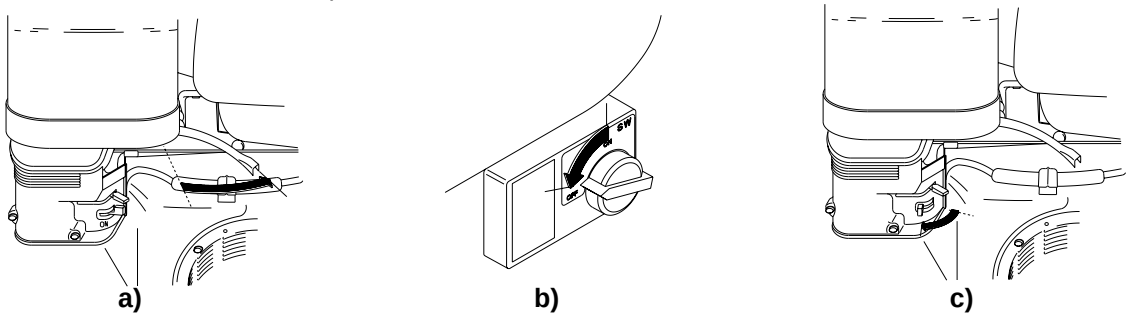
The engine speed can be infinitely varied with the throttle control lever (5).
The direction of travel is determined with the operating control handle (6).
Depending on the position of the control handle (6), the vibration plate compacts in forward direction, on the spot or in reverse direction.



Forwards **On the spot** **Reverse**

Stopping the engine

To stop the engine in an emergency, turn the engine switch to the OFF position. Under normal conditions, use the following procedure:
a) Move the throttle lever fully to the right.
b) Turn the engine switch to the OFF position.
c) Turn the fuel valve to the OFF position.



a) **b)** **c)**

Maintenance schedule

Check all external screw connections for tight fit approx. 8 hours after first operation.		
Parts	**Maintenance jobs**	**Maintenance interval**
Air filter	Check for external damage and tight fit. Check filter cartridge, clean or replace if necessary.	daily
Fuel tank	Check tank lid for tight fit, replace if necessary.	
Drive engine	Check oil level, top up if necessary.	
Exciter	Check for tightness.	
Drive engine	First oil change.	20 hours
Centre pole	Grease moveable locking device, and spindle or pole height adjustment.	monthly
Drive engine	Clean spark plug, check spark plug gap 0,7 mm.	
Centre pole head	Check oil level, top up if necessary.	
V-belt	Check V-belt tension - retension, if need be.	
Protective frame	Check fastening screws of protective frame and central suspension for tight fit.	
Drive engine	Oil change.	100 hours
Exhaust muffler	Remove combustion residue from spark arrester.	
Exciter	Oil change.	
Exciter	Check oil level-fill up, if need be.	150 hours
Exciter	Oil change.	250 hours
Drive engine	Valve clearance - Check, set - 0,15 mm intake valve, 0,20 mm exhaust valve.	300 hours

Engine oil

Oil change

Drain the oil while the engine is still warm to assure rapid and complete draining.

1. Remove the oil filler cap and the drain plug to drain the oil.
2. Install the drain plug, and tighten it securely.
3. Refill with the recommended oil and check oil level.
4. Install the oil filter cap.

Engine oil capacity: 1,1 l (1,06 USqt., 1,78 lmp pt)

Air filter

Air filter service

A dirty air filter will restrict air flow to the carburettor. To prevent carburettor malfunction, service the air filter regularly. Service more freqently when operating the engine in extremely dusty areas.

Warning: Never use gasoline or low flash point solvents for cleaning the air cleaner element. A fire or explosion could result.

Caution: Never run the engine without the air cleaner. Rapid engine wear will result.

Dual type air filter

1. Remove the wing nut and the air filter cover. Remove the elements and separate them. Carefully check both elements for holes or tears and replace if damaged.
2. Foam element: Wash the element in a solution of household detergent and warm water, then rinse thoroughly, or wash in nonflammable or high flash point solvent. Allow the element to dry thoroughly. Soak the element in clean engine oil, and squeeze out the excess oil. The engine will smoke during initial start-up if too much oil is left in the foam.
3. Paper element: Tap the element lightly serveral times on a hard surface to remove excess dirt, or blow compressed air through the filter from the inside out. Never try to brush the dirt off; brushing will force dirt into the fibers.
   Replace the paper element if it is excessively dirt.

Fuel tank

Fuel strainer cup cleaning

Turn the fuel valve to Off. Remove the sediment cup and O-ring, and wash them in nonflammable or high flash point solvent. Dry them thoroughly, and reinstall securely. Turn the fuel valve on, and check for leaks.

Spark plug

Spark plug service

Recommended spark plug: BP6ES-11, BPR6ES-11 (NGK), W20EP-U11, W20EPR-U11 (ND).

Caution: Never use a spark plug of incorrect heat range.
To ensure proper engine operation, the spark plug must be properly gapped and free of deposits.

1. Remove the spark plug cap, and use a spark plug wrench to remove the plug.
   Warning: If the engine has been running, the muffler will be very hot. Be careful not to touch the muffler.
2. Visually inspect the spark plug. Discard it if the insulator is cracked or chipped. Clean the spark plug with a wire brush if it is to be reused.
3. Measure the plug gap with a feeler gauge. The gap should be 0,7-0,8 mm (0.039-0.043 in). Correct as necessary by bending the side electrode.
4. Check that the spark plug washer is in good condition, and thread the spark plug in by hand to prevent cross-threading.
5. After the spark plug is seated, tighten with a spark plug wrench to compress the washer.

   Note: If installing a new spark plug, tighten 1/2 turn after the spark plug seats to compress the washer. If reinstalling a used spark plug, tighten 1/8-1/4 turn after the spark plug seats to compress the washer.

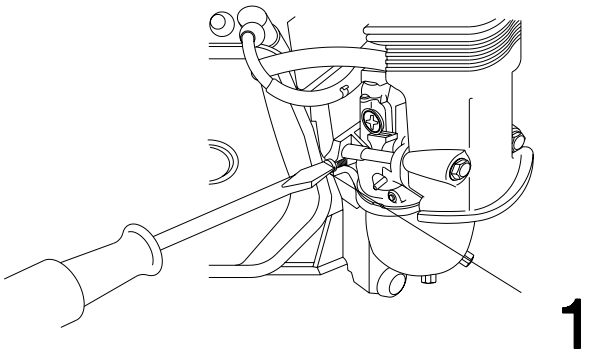
   Caution: The spark plug must be securely tightened. An improperly tightened spark plug can become very hot and may damage the engine.

Carburettor

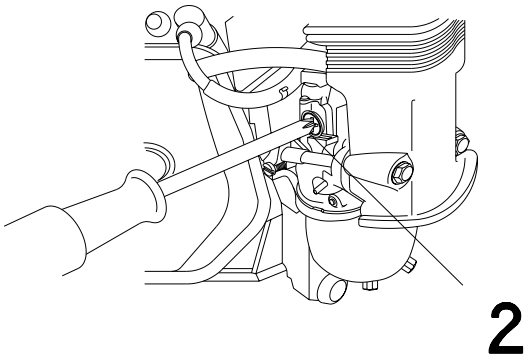
Carburettor adjustment

* Start the engine and allow it to warm up to normal operting temperature.
* With the engine idling, turn the pilot screw in or out to the setting that produces the highest idle rpm. The correct setting will usually be approximately 2 1/4 turns from the fully closed position.

   Caution: Do not tighten the pilot screw against its seat as this will damage the pilot screw or seat. After the pilot screw is correctly adjusted, turn the throttle stop screw to obtain the standard idle speed. Standard idle speed: 1 400 ± 150 rpm.



1. Pilot screw



2. Throttle stop screw

Service instructions

1. Adjusting the V-belt tension

   Remove belt guard. Loosen nuts situated on the motor V-belt pulley and remove outer V-belt pulley half. Remove necessary number of shims (the removal of one shim is usually suffecient). Install the removed shims on the outside of the V-belt pulley. (If one shim is removed, install it on the outer half of the pulley, if two, one on the outer and one on the inner V-belt pulley half, etc.). Thus V-belt alignment is maintained. Install spring washer in a way such that the large collar comes to lie on the motor V-belt pulley. Loosen nuts and under continual rotation of the engine V-belt pulley tighten nuts alternately. Allow engine to run for a short while, if necessary retighten nuts.

2. Lubricating the exciter

   On delivery of the machine, the exciter is filled with oil. Change oil after every 250 hours of operation, use 0,75 l SAE 10 W 40. For this purpose place the vibration plate on level ground. Remove drain plug situated on the outside of the vibration plate. If necessary, remove the extension plate before draining the oil. This will avoid unwanted spillages. Correct oil level = lower edge of threaded bore.

Hydraulic control

When checking the oil level in the motor and exciter, also check oil level in the centre pole head and top up if necessary. Top up to mark when centre pole is placed in vertical position. If there is too much oil in the centre pole head the reverse motion is hard to engage, if the quantity of oil is insufficient the advance speed is reduced. We use hydraulic oil Fuchs Renolin MR 520, suitable also for low temperatures, in the hydraulic systems as standard.

Mounting instruction

1. Exciter

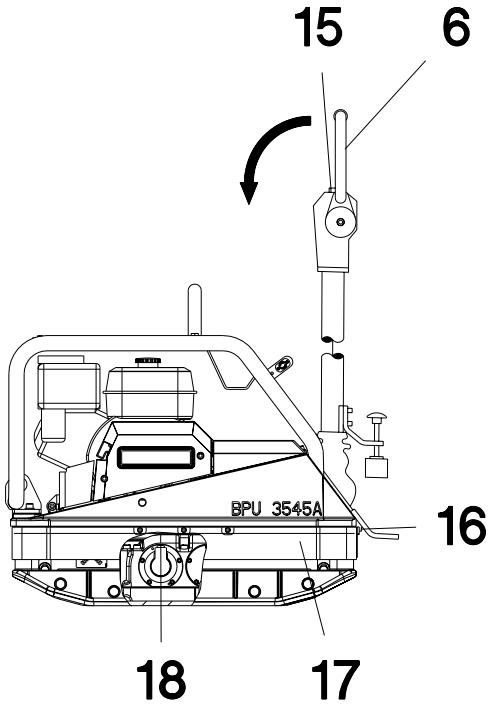
   When disassembling exciter components, always remove eccentric weights first. When assembling, the eccentric weights have to be installed last of all. When installing exciter shafts mind marking of toothed gears. Assembly of exciter shaft is correct when all eccentric weights point down while piston is at half stroke. During assembly of eccentric weights on exciter shaft, keep shafts blocked to avoid pinching of fingers. Mind lefthand thread when assembling V-belt pulley. Tighten all screws with the prescribed torque, mind qualities of screws (see screw head).

2. Hydraulic control

   Bleed hydraulic system after having topped up with oil, then check oil level again (total quantity required approx. 0,4 liters).

3. Bleeding hydraulic control:

1. Remove apron (17) by undoing the screws (16).
2. Move centre pole into vertical position, move control handle (6) right into the reverse position, open filler bore (15).
3. Loosen connecting screw (18).
4. Slowly push the control handle (6) in forward direction until hydraulic oil emerges bubblefree at the connection screw.
5. Tighten connecting screw (18), mount apron (17).
6. If necessary, top up with Fuchs Renolin MR 520, seal filler bore (15).



4. Centre pole head

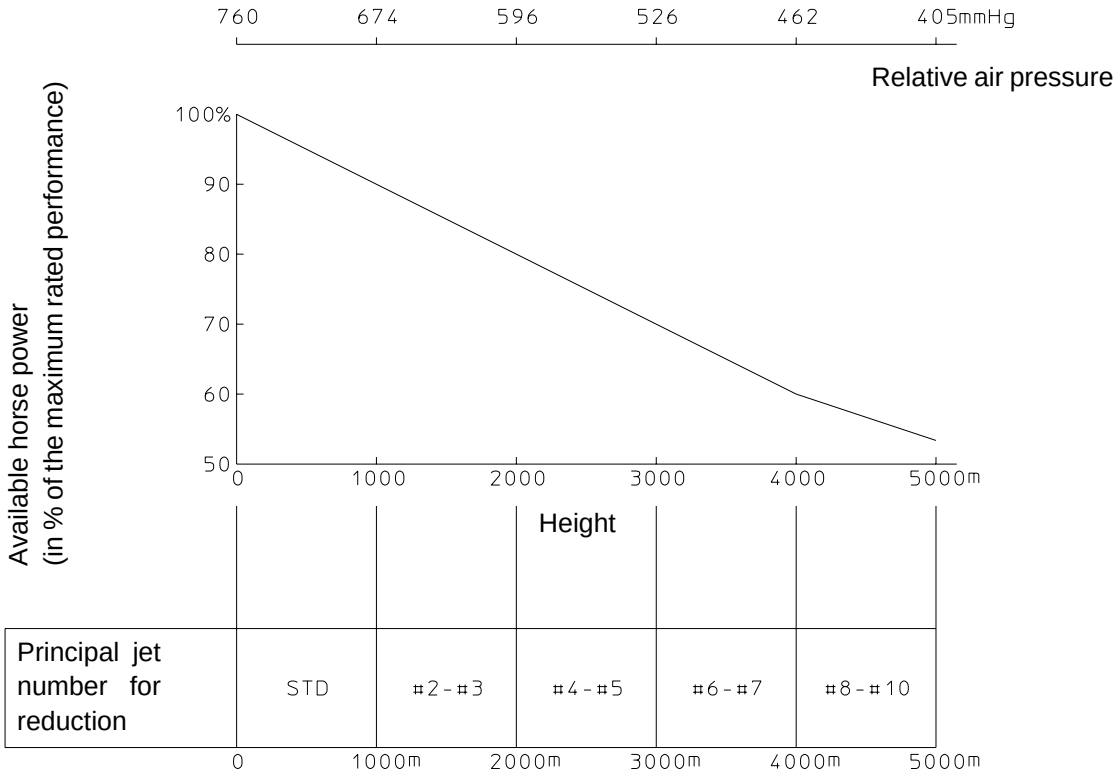
ATTENTION! When disassembling the centre pole head, please mind that the piston is installed under spring tension. When assembling, locate toothed rod in toothed gear in a way such that the handle is set a 90^{o} to the centre pole head when piston is fully extended.

5. Test-run equipment for approx. 5 min. to bleed air from system.

High altitude applications

Air is rarer at greater altitudes and the main jet of the standard carburettor supplies the engine with an extremely rich fuel-air mixture. This, in turn, leads to a loss of engine power and the consequent increase in fuel consumption.

High altitude engine power can in general be improved when installing a smaller main jet and through adjustment of the pilot screw. The engine only looses approximately 10 % of its performance number per 1000 m (3000 feet) height increase if the carburettor jet is correctly set. The engine looses yet more power if no main height jet is installed.
The following graph shows the relation between height influence and performance number for a correctly set jet.
Always check out the built-in standard jet before proceeding to order or calculate additional jets. These can vary in some types of equipment, models or countries.



Example: A jet size factor of 85 % should be used for a height of 1500 m (3000 feet).
If the equipment is fitted out with a standard main jet # 68, the recommended jet for a height of 1500 m (3000 feet) would be # 65 jet (68 - 3 = 65).

For quick reference: The size of the jet is easily determined by means of part number.

Example:	99101-ZF5-0850	Jet # 85
	99101-ZF5-0800	Jet # 80
	99101-ZF5-0820	Jet # 82

Comment:
At a height of 1500 m (3000 feet), a correctly set engine will deliver approximately 85 % of the maximum power delivered at sea level. Do not demand more than 85 % of the maximum power delivered at sea level if you are going to be running the machine continuously.

Forward speed too low

Cause: - Too little hydraulic oil in the centre pole head.
- Air in hydraulic control.

Remedy: - Top up hydraulic oil.
- Bleed system.

Reverse speed too low

Cause: - Too much oil in centre pole head.

Remedy: - Correct oil level in accordance with mark.

No reverse motion

Cause: - Mechanical fault.

Remedy: - Contact Wacker service dept.

Loss of hydraulic oil

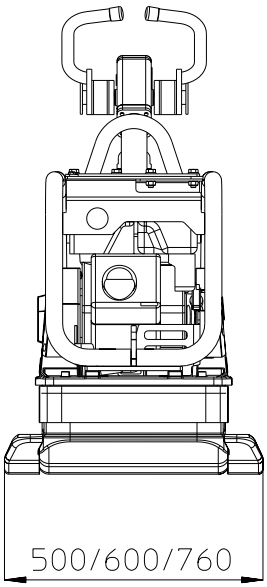
Cause: - Leaks, hydraulic hose defective.

Remedy: - Change defective parts.
Note: Bleed system after every dismantling operation.

Engine does not start

Cause: - Fuel tank empty.
- Fuel shut-off valve closed.
- Air filter dirty.
- Stop button defective.
- Recoil starter defective.
- Oil alert system has stopped engine.

Remedy: - Fuel up.
- Open.
- Clean.
- Repair.
- Repair.
- Fill up with engine oil.



Accessories	Part No.
Set of blanking bolts for use without extension plates	0067519
Set of extension plates narrow (500 wide)	0126290
Set of extension plates Serial (600 wide)	0045201
Set of extension plates wide (760 wide)	0043246

EC - CONFORMITY-CERTIFICATE

Wacker-Werke GmbH & Co. KG , Preußenstraße 41, 80809 München

hereby certify that the construction equipment specified hereunder:

1. Category: **Vibratory plate**

2. Type: **BPU 3545A**

3. Equipment item number: **0008783 ...**

4. absolute installed power: **6,61 kW**

has been evaluated in conformity with Directive 2000/14/EC:

Conformity assessment procedure	At the following notified body	Measured sound power level	Guaranteed sound power level
Annex VIII	**VDE Prüf- und Zertifizierungsinstitut Zertifizierungsstelle Merianstraße 28 63069 Offenbach/Main**	**106 dB(A)**	**108 dB(A)**

and has been manufactured in accordance with the following directives:

2000/14/EG
EMV - Richtlinie 89/336/EG
98/37/EG
EN 500-1
EN 500-4

.....

Technical Management
Dr. Sick

File certificate carefully

VDE Prüf- und Zertifizierungsinstitut

VDE VERBAND DER ELEKTROTECHNIK
ELEKTRONIK INFORMATIONSTECHNIK e.V.

C E R T I F I C A T E

Registration Number 6236 / QM / 06.97 (AB)

This is to certify that the company

WACKER

Wacker-Werke GmbH & Co. KG

located at

Munich plant
Preussenstr. 41
80809 München
Reichertshofen plant (AB)
Karlsfeld logistics Centre
Branches and service depots all over Germany

has implemented and maintains a
Quality System for the following scope

Machine manufacture
Construction machines

This Q System complies with the requirements of

DIN EN ISO 9001:1994

This Certificate is valid until 05.06.2003

VDE Testing and Certification Institute
Certification

D-63069 Offenbach/Main, Merianstraße 28
Date 14.06.2000

The VDE Testing and Certification Institute is accredited by DARAccreditation Bodies according to DIN EN 45012 and notified in the EU under ID. No. 0366.

Deutscher Akkreditierungs Rat
DAR
TGA-ZQ-009/92-00

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